

1 REMARKS

2 Status of the Claims

3 Claims 1 - 36 are now pending in the present application, Claims 14 and 33 having been
4 amended to correct typographical errors and Claims 1, 19, 24, and 36 having been amended to more
5 clearly distinguish the subject matter from the cited art.

6 Telephone Interview Request

7 In the event that the Examiner is not persuaded by the following arguments that these claims
8 are in condition for allowance, applicants respectfully request that the Examiner telephone applicants'
9 attorney to schedule a mutually convenient time for a Telephone Interview in order to discuss how
10 applicants might advance prosecution of the above-identified application to issue.

11 Claims Rejected Under 35 U.S.C. § 103(a)

12 The Examiner has rejected Claims 1, 2, 4-8, 10-27, 29-34, and 36 under 35 U.S.C. § 103(a) as being
13 unpatentable by U.S. Patent No. 6,128,279 (O'Neil et al., hereinafter referred to as "O'Neil") in view of
14 U.S. Patent No. 6,438,652 (Jordan et al., hereinafter referred to as "Jordan").

15 In the interest of reducing the complexity of the issues for the Examiner to consider in this response,
16 the following discussion focuses on amended independent Claims 1, 19, 24, and 36. The patentability of
17 each dependent claim is not necessarily separately addressed in detail. However, applicants' decision not to
18 discuss the differences between the cited art and each dependent claim should not be considered as an
19 admission that applicants concur with the Examiner's conclusion that these dependent claims are not
20 patentable over the cited references. Similarly, applicants' decision not to discuss differences between the
21 prior art and every claim element, or every comment made by the Examiner, should not be considered as an
22 admission that applicants concur with the Examiner's interpretation and assertions regarding those claims.
23 Indeed, applicants believe that all of the dependent claims patentably distinguish over the references cited.
24 However, a specific traverse of the rejection of each dependent claim is not required, since dependent claims
25 are patentable for at least the same reasons as the independent claims from which the dependent claims
26 ultimately depend.

27 Rejection of Independent Claim 1

28 Significant differences exist between applicants' Claim 1 and the cited combination of O'Neil and
29 Jordan because the combined references do not teach or suggest the functionality of applicants' intake
30

1 message as recited in step (d) namely, that the intake message identifies the second resource as an
2 intake, and specifies that *"the new intake is a single entry-point service resource in the cluster."*

3 Applicants' step (d) as amended recites (with emphasis added):

4 designating the second resource as the new intake and providing an intake
5 message from the first resource to the plurality of resources in the cluster *identifying*
6 *the second resource as the new intake, wherein the new intake is a single entry-point*
service resource in the cluster;

7 The Examiner has asserted that the cited art teaches applicants' step (d). Although O'Neil
8 does not specifically teach that the first intake provides a message to the cluster identifying the
9 second resource as the intake, the Examiner asserts that Jordan teaches the communication of a server
10 that indicates that it is no longer available to process requests, and requests the routing to another
11 server, which the Examiner indicates constitutes the announcement of intake designation to a second
12 server. In support of his assertion, the Examiner cites column 4, lines 15-27, which is reproduced
13 below:

14 In another example, an overloaded cooperating cache server can identify a less
15 loaded cooperating cache server, and communicate a shift request and a copy of the cached
16 object to the less loaded cooperating cache server (which then caches the object), so that
17 subsequent requests for the object will not be forwarded. Alternatively, an overloaded
18 cooperating cache server can communicate the shift request to the less loaded cooperating
19 cache server, which then obtains a copy of the object from an originating object server, in
20 response to the shift request. In yet another alternative, the owning cache server can
21 multicast the shift request message to one or more of the other cooperating cache servers so
22 that subsequent forward requests will be shifted. (Emphasis added, Jordan, column 4,
23 lines 14-27.)

24 The Examiner concludes that it would have been obvious to one of ordinary skill in the art at the
25 time of the invention to include the communication of a message, to indicate that a certain server is no
26 longer the intake server, as taught by Jordan in the system of O'Neil. The Examiner asserts that the
27 motivation for doing so is to enable a server in use to communicate with a system that it is unavailable for
28 further requests, to thus provide more efficiency in the system, by effectively disallowing overburdening the
29 server. The Examiner further notes that both the present application and the inventions discussed in the
30 cited art are directed to the same field of endeavor, namely the load balancing of servers.

1 Jordan Does Not Teach Or Suggest An Equivalent of Applicants' "Intake"

2 Under the section entitled "Response to Arguments" the Examiner cites the underlined
3 portion of the above citation as teaching that the shift request identifies a less-loaded server, as
4 further evidenced by the use of the word "the" in the cited portion, in describing a less-loaded server.
5 Therefore, the Examiner concludes that this constitutes identification of the server that will serve as
6 the new intake. In addition, the Examiner asserts that a message is sent to the other servers,
7 indicating that the less-loaded server has been chosen as the one servicing new requests. It is further
8 asserted that Jordan thus provides the teaching of an intake message, designating a new and specific
9 server as the new intake, sent out by the original intake. Further, the Examiner asserts that a message
10 is sent to the other servers, indicating that the less-loaded server has been chosen as the one servicing
11 new requests, which the Examiner asserts constitutes the teaching of an intake message, designating a
12 new and specific server as the new intake, sent out by the original intake. The Examiner next
13 indicates that further support for this teaching may be found in column 9, lines 9-15 and 33-36 of
14 Jordan, wherein the multicasting of a message indicating that further requests will be routed to a new
15 specific owner is taught. The Examiner also states that a message indicating a new shared ownership
16 is taught, which in the event of a shift request message by a first shared owner, new requests will be
17 routed to the second shared owner, and not the first one, which further constitutes another example of
18 Jordan's disclosure of an intake message.

19 Applicants have amended step (d) in Claim 1 to clarify that the second resource is a new
20 *intake*, wherein an intake is defined as ***a single entry-point service resource in a cluster*** (see
21 applicants' specification, page 7, lines 13-14). A separate intake is designated for each different type
22 of service that is being provided by the cluster such that clients are grouped together and processed in
23 a group at a service resource for as long as the service is provided by the resource (see applicants'
24 specification, page 7, lines 14-18). Applicants' specification provides:

25 One game service instance of each type of game is designated as an "intake"
26 for the cluster. The intake for a specific type of game serves as a central point for new
27 client requests and groups, or matches, clients into a game. For example, Checkers
28 game service 112aa is designated as the Checkers intake 124 for the Checkers game
29 type. Similarly, Hearts game service 110bb is designated as the Hearts intake 126 for
30 the Hearts game type. Any game service instance can be designated the intake for that
game type regardless of which node within the cluster is executing the designated
game service instance. However, only one game service instance can be designated as
the intake for each type of game. A game service instance that is designated as the

intake for a game type is responsible for accepting new client requests to participate in that type of game. (Emphasis added, applicants' specification, page 13, line 36-page 14, line 9).

For example, as disclosed in the underlined portion above, an intake is a game service instance of each type of game that is designated such as a Checkers intake 124, while another is designated as a Hearts intake 126 and these intakes will process the group for as long as the service is provided. In contrast, Jordan does not disclose any equivalent of an intake meeting the recited definition of a *single entry-point service resource in a cluster*, but instead, discloses an owning cache server (see Jordan, column 9, line 31) as illustrated in Figure 2a under ownership 1012. Jordan's Figure 4 shows an example of a logic flow chart for a cache server in response to a request for an object either directly 155 from a browser 160 or forwarded 125 from the load monitor 120. Step 305 describes how the cache server (that received the request) will fetch the object from the originating web server and return the object (Jordan, column 7, lines 33-36). The process then ends, in a step 306. Thus, Jordan's servers are simply cache servers that fetch and return objects and are therefore not equivalent to an intake that is a single entry-point service resource in a cluster, as recited by applicants' claim.

With respect to the Examiner's assertion that Jordan teaches a message that identifies a less loaded server, applicants respectfully disagree and note that Jordan's *shift request* does not identify a less-loaded server that will serve as the new intake, as is evident from the following:

For example, the present invention can be configured to perform load balancing for a collection of cooperating proxy cache servers where each cache server 150 multicasts to a list of cooperating cache servers to locate a copy of a locally missed object. In this case, no specific ownership information need be maintained anywhere in the system. However, there is also no guarantee of finding an object from the cooperating cache servers, either. Assume that a logical load monitor 120 is used to maintain the load conditions 1021 of all proxy cache servers and share this information with each cache server 150. The load balancing can be achieved by excluding overloaded servers from the list of cooperating servers to which a cache server multicasts its request (also called a shift request). As a result, only less loaded cache servers will receive forwarded requests 125. (Emphasis added, Jordan, column 7, line 66-column 8, line 13).

As stated in the underlined portions of the above quote, Jordan's shift request is a request wherein a cache server multicasts to a **list** of other cache servers in order to locate a copy of a locally

missed object. Overloaded servers are excluded from the list to which the cache server multicasts the request, which Jordan indicates is also called a *shift request*. The shift request is thus sent to those servers on a list that are not overloaded, but a shift request is not an intake message. The shift request is multicast to **a list of servers that are not overloaded**, but that step is not equivalent to identifying **a specific server** that is not overloaded and has been designated as the new intake. Thus, Jordan does not teach an equivalent of applicants' intake message as recited in subparagraph (d) of Claim 1.

With respect to the Examiner's assertion regarding a message being sent to the other servers, Jordan does NOT teach that a message is sent to the other servers, indicating that a specific less-loaded server has been chosen to service new requests, identifying that server as being the new intake. Jordan's Figure 3 shows an example of a logic flow chart for the load monitor in response to a request from a cache server because of a cache miss and its accompanying disclosure is reproduced below:

FIG. 3 shows an example of a logic flow for steps taken by the load monitor 120 in response to a request 125 from a cache server 150 because of a cache miss. As depicted, in step 201, it checks to see if the requested object/partition can be found in the caching table. If not, in step 202, a new entry is created for the object/partition and a cache server is assigned as its owner. After the entry is located in the caching table, in step 203, the forwarding frequency 1011 is updated, e.g., incremented by 1. The load monitor then examines the load table 102 to see if the owner is currently overloaded (and that the forwarding frequency 1011 is a significant contributor thereto), in step 204. If yes, in step 205, the load monitor finds an underloaded (or less loaded) cache server and assign it as the new 10122 (or shared) owner 10122 of the requested object. The ownership information 1012 for the object in the caching table 101 is updated accordingly. Those skilled in the art will appreciate that the logic flow could comprise a shared 10123 or hierarchical ownership 1012 in the caching table 101 or other data structure employed. The request (possibly with a copy of the requested object) can then be forwarded 125 to a new sole 10122 (or shared 10123) owner, in step 206. Alternatively, the new owner can be requested to obtain 115 an object copy from the originating object server, e.g., via the Internet 110. Those skilled in the art will appreciate that the load checking step 204 can be performed proactively, i.e., periodically or in response to an identified overload or overload trend 1021 due at least in part to a high forwarding frequency 1011--for a given object id/partition id 1010 and cache server (ownership 1012). If so, then in step 205, the load monitor finds an underloaded (or less loaded) cache server, assigns it as the new (or shared) owner of the requested object, and possibly sends a copy of the object to the new (or shared) owner as above. Conversely, if a shared ownership model is used, in step 208, when the load condition 10211 and forwarding frequency 10111 for a shared ownership object (p 10101) drops below a predetermined threshold, in step 209, the shared ownership (B, A 10121) can be merged to a single ownership and one of the copies

1 purged from one of the cache servers A 10121, e.g., to make room for another hot
2 object. (Emphasis added, Jordan, column 6, line 50-column 7, line 22).

3 As evident from the underlined portion above, Jordan explains how the load monitor receives
4 a forward request 125 from a cache server 150 because of a cache miss, and as provided in a
5 step 201, the load monitor checks to see if the requested object is in a caching table. If the requested
6 object is not in the caching table, in addition to updating its forwarding frequency, the load monitor
7 then finds an underloaded or less loaded cache server and assigns it as the new or shared owner of the
8 requested object (Jordan, column 6, lines 63-65). Thus, the *ownership information of the object in*
9 *the caching table is updated* (Jordan, column 6, lines 65-67). In Jordan, it is these steps that update
10 the caching table, which identifies a less loaded cooperating cache server. But, it is important to note
11 that the identification takes place in the caching table and not in an equivalent of applicants' recited
12 *intake message*.

13 Jordan also teaches that a request can be forwarded to the new owner, as shown in a step 206.
14 But again, a forwarded request does not identify a less-loaded server. Instead, the caching table
15 identifies the owner or less loaded server. Accordingly, the request 125 (i.e., forwarded requests 125)
16 is also not equivalent to applicants' *intake message* because of this lack of identification in the
17 request.

18 Based upon the preceding comments, it should be apparent that the rejection of independent Claim 1
19 over O'Neil in view of Jordan should be withdrawn, because O'Neil and Jordan do not teach or suggest all
20 of the elements of independent Claim 1. Specifically, the cited art does not teach or suggest any equivalent
21 to an intake message or describe a server that serves as a new intake, as recited by applicants' amended
22 claim.

23 Claims 2-18 ultimately depend from independent Claim 1. Because dependent claims inherently
24 include all of the steps or elements of the independent claims from which the dependent claims ultimately
25 depend, dependent Claims 2-18 are patentable for at least the same reasons discussed above with regard to
26 independent Claim 1. Therefore, the rejection of dependent Claims 2-18 under 35 U.S.C. § 103(a) over
27 O'Neil and in view of Jordan should be withdrawn.

28 Rejection of Independent Claim 19

29 Independent Claim 19 is directed to a system for distributing a processing load in a cluster. Clearly,
30 for the same reasons already noted above in regard to independent Claim 1, Claim 19 also distinguishes

over O'Neil and Jordan, because O'Neil and Jordan do not teach or suggest providing an *intake* message from a first resource to a plurality of resources in the cluster, for *identifying* the second resource as the new intake, wherein the new intake is a single entry-point service resource in the cluster.

Accordingly, the rejection of independent Claim 19 over O'Neil and further in view of Jordan should be withdrawn for the reasons discussed above. Because dependent claims include all of the elements of the independent claim from which the dependent claims ultimately depend and because O'Neil and Jordan do not teach or suggest all of the elements of independent Claim 19, the rejection of dependent Claims 20-23, under 35 U.S.C. § 103(a) over O'Neil and Jordan should also be withdrawn, for at least the same reasons as the rejection of Claim 19.

Rejection of Independent Claim 24

Independent Claim 24 is directed to a method of distributing a processing load among a cluster of nodes, each node providing at least one of a plurality of different types of services. Clearly, for the same reasons already noted above in regard to independent Claim 1, this claim also distinguishes over O'Neil and Jordan, because O'Neil and Jordan do not teach or suggest providing an *intake* message from the first node designated as the intake for the first instance, to the nodes in the cluster *identifying* the second instance as the new intake for the first type of service, wherein the new intake is a *single entry-point service resource in the cluster*.

Accordingly, the rejection of independent Claim 24 under 35 U.S.C. § 103(a) over O'Neil and Jordan should be withdrawn based on the reasons discussed above. Because dependent claims include all of the elements of the independent claim from which the dependent claims ultimately depend, and because O'Neil and Jordan do not teach or suggest all of the elements of independent Claim 24, the rejection of dependent Claims 25-35, under 35 U.S.C. § 103(a) over O'Neil and Jordan should also be withdrawn, for at least the same reasons as the rejection of Claim 24.

Discussion of the Rejection of Independent Claim 36

Independent Claim 36 is directed to a system for distributing a processing load in a cluster of resources. However, O'Neil and Jordan fail to teach or suggest providing an *intake* message from a first resource to a plurality of resources in a cluster *identifying* a second resource as an intake, wherein the intake is a single entry-point service resource in the cluster. For the same reasons already noted above in regard to independent Claim 1, this claim also distinguishes over O'Neil and Jordan. Accordingly, the rejection of independent Claim 36 under 35 U.S.C. § 103(a) over O'Neil and Jordan should be withdrawn.

1 In view of the Remarks set forth above, it will be apparent that the claims in this application
2 define a novel and non-obvious invention. The application is in condition for allowance and should
3 be passed to issue without further delay. Should any further questions remain, the Examiner is
4 invited to telephone applicants' attorney at the number listed below.

5 Respectfully submitted,
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